

## REMARKS

Claims 1-12 have been canceled. New claims 13-21 have been added. Thus, claims 13-21 are presented for examination.

New Claim 13 corresponds to canceled Claim 1, except that the proportion of substitution of the hydrogen atoms within those of all phenolic hydroxyl groups of the alkali soluble novolak resin by 1,2-naphthoquinone diazide sulfonyl groups is to 3 to 7 mol%, and that component (B) is defined as an organic solvent comprising 70 to 90% by weight of a propylene glycol alkyl ether acetate, and ethyl lactate. Full support for Claim 13 is found in the specification, for example, at page 2, line 26 to page 3, line 2; page 8, lines 12 to 13 and 21 to 25; page 9, lines 23 to 25; and page 10, line 2. New Claim 14 corresponds to canceled Claim 2. Support for Claim 14 is found, for example, at page 5, lines 14 to 17 of the specification. New Claim 15 corresponds to canceled Claim 3. Support for Claim 15 is found, for example, at page 9, lines 11 to 12 of the specification. New Claim 16 corresponds to canceled Claim 9. Support for Claim 16 is found, for example, at page 8, line 25 of the specification. New Claim 17 recites (C) an alkali soluble acrylate resin. Support for Claim 17 is found, for example, at page 10, line 28 of the specification. New Claim 18 corresponds to canceled Claim 10. Support for Claim 18 is found, for example, at page 11, lines 4 to 7 of the specification. New Claim 19 corresponds to canceled Claim 11. Support for Claim 19 is found, for example, at page 12, lines 16 to 21. New Claim 20 corresponds to canceled Claim 12. Support for Claim 20 is found, for example, at page 13, line 26 to page 14, line 4. New Claim 21 corresponds to canceled Claim 7. Support for Claim 17 is found, for example, at page 3, lines 3 to 6 of the specification. Thus, no new matter has been added.

Reconsideration and withdrawal of the present rejections in view of the amendments and comments presented herein are respectfully requested.

### Rejections under 35 U.S.C. §103(a)

**Bassett et al. (US 5,145,763) in view of Mizuta et al. (US 6,869,742), with Komano (US 4,847,178), Nishio et al. (US 6,101,816) and Misumi et al. (US 2003/0059706)**

Claims 1-12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Bassett et al. (US 5,145,763) in view of Mizuta et al. (US 6,869,742), in combination with Komano (US 4,847,178), Nishio et al. (US 6,101,816) and Misumi et al. (US 2003/0059706)

The Examiner stated that it would have been *prima facie* obvious to: 1) substitute the novolak resin in Mizuta et al. as the photosensitive novolak resin in Bassett et al. and reasonably expect the same or similar results as disclosed in Bassett et al. (high resolution, sensitivity and definition); 2) have a reaction percentage of about 3.8% of the hydrogen atoms on the novolak resin as recited in Mizuta et al; and 3) to add a known plasticizer into the composition and reasonably expect excellent coating properties, flexibility and anti-brasion properties. However, as explained below, this combination of references would not render the claimed invention obvious.

The Examiner points out that Mizuta teaches a combination of propylene glycol alkyl ether acetate with ethyl lactate as the organic solvent. However, neither Mizuta nor the cited secondary references has any teaching or suggestion of the specific combination recited in the presently pending claims of 70 to 90% by weight of a propylene glycol alkyl ether acetate with ethyl lactate as the organic solvent. In fact, Mizuta exemplifies ethyl lactate as a preferred solvent, but not propylene glycol alkyl ether acetate (see Mizuta, column 8, lines 63 to 67). Further, in all working examples of Mizuta, a mixed solvent of ethyl lactate and butyl acetate with mixing ratio of 9:1 (i.e. only 10% acetate compound) is used. Therefore, by combining the teachings of the secondary references with the teachings of Mizuta, a skilled person in the art would not have arrived at the specific organic solvent (B) used in the present invention which contains a propylene glycol alkyl ether acetate in an amount as large as 70 to 90% by weight.

Applicants acknowledge that a positive photoresist composition, like that of Bassett et al., which comprises a photosensitive novolak resin formed from an alkali-soluble novolak resin in which some hydrogen atoms within those of all phenolic hydroxyl groups of the alkali-soluble novolak resin are substituted by 1,2-naphthoquinone diazide sulfonyl groups can achieve perpendicularity and high sensitivity for a resist pattern in a thick film. However, such a composition has a problem in that the development velocity thereof is quite slow. The present inventors have unexpectedly discovered that the positive photoresist composition as recited in new Claim 13 substantially increases the development velocity. See, the summary of Examples 1-2 and Comparative Examples 1-3 in Table 1 on page 29 of the specification.

Moreover, the presently claimed invention has additional, unexpected benefits that could not have been predicted from the cited references. Specifically, by using a mixed solvent of 70 to 90% by weight of a propylene glycol alkyl ether acetate, and ethyl lactate, not only can the development velocity of the resist composition be increased while maintaining the effect by the

component (A) (good sensitivity and perpendicularity of resist pattern formed), but also the heat resistance of the resist composition can be improved (see specification at page 9, lines 5-10, and page 10, lines 2- 4). This is also shown Example 2 of the specification (see page 29, Table 1 and lines 8-11).

In summary, nothing in the cited combination of references would teach or suggest the invention as presently claimed. Furthermore, even if such a combination had been suggested, the presently claimed invention provides at least two significant unexpected results, namely increasing the development velocity and obtaining high heat resistance. These unexpected results further evidence the nonobviousness of the claims. As such, withdrawal of the rejection over Bassett et al. and the secondary references is respectfully requested.

**Okazaki et al. (US 5,422,221) in view of Nishi et al. (5,759,736), and Mizuta et al. (US 6,869,742), with Komano (US 4,847,178), Nishio et al. (US 6,101,816) and Misumi et al. (US 2003/0059706)**

Claims 1-12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Okazaki et al. (US 5,422,221) in view of Nishi et al. (5,759,736), and Mizuta et al. (US 6,869,742), with the combination of Komano (US 4,847,178), Nishio et al. (US 6,101,816) and Misumi et al. (US 2003/0059706).

The Examiner alleged that it would have been *prima facie* obvious to: 1) use a mixture of ethyl lactate and polypropylene glycol monomethyl ether acetate to dissolve the components of Okazaki et al. and reasonably expect same or similar results with respect to smooth coating properties and excellent storage stability; 2) to substitute the novolak resin in Mizuta et al. as the photosensitive novolak resin in Bassett et al. and reasonably expect the same or similar results as disclosed in Bassett et al; and 3) to add a known plasticizer into the composition and reasonably expect excellent coating properties, flexibility and anti-brasion properties .

As mentioned above, none of Komano, Nishio and Misumi has any teaching or suggestion about a mixed solvent of a propylene glycol alkyl ether acetate with ethyl lactate for dissolving the resin component. In addition, as noted by the Examiner, Okazaki lacks a working example of a propylene glycol alkyl ether acetate and ethyl lactate for dissolving the resin component.

Although Nishi and Mizuta teach the use of propylene glycol alkyl ether acetate and ethyl lactate as components of the organic solvent, neither reference teaches or suggests the specific combination of 70 to 90% by weight of a propylene glycol alkyl ether acetate with ethyl lactate as the organic solvent. In fact, as also discussed above, Mizuta exemplifies ethyl lactate as a preferred solvent, but not propylene glycol alkyl ether acetate (see Mizuta, column 8, lines 63 to 67). Further, in all working examples of Mizuta, a mixed solvent of ethyl lactate and butyl acetate with mixing ratio of 9:1 (i.e. only 10% acetate compound) is used. Therefore, by combining the teachings of the secondary references with the teachings of Mizuta, a skilled person in the art would not have arrived at the specific organic solvent (B) used in the present invention which contains a propylene glycol alkyl ether acetate in an amount as large as 70 to 90% by weight.

Similarly, Nishi neither teaches nor suggests the recited combination of 70 to 90% by weight of a propylene glycol alkyl ether acetate with ethyl lactate as the organic solvent. In fact, the mixed solvent used in the working examples of Nishi contains 21 g of ethyl lactate and 9 g of propylene glycol monoethyl ether acetate. That is, the amount of propylene glycol monoethyl ether acetate contained in the mixed solvent used in Nishi is  $9\text{ g}/(21\text{ g} + 9\text{ g}) \times 100\% = 30\%$ , which is outside the range as recited in Claim 13 of the present application (70 to 90 %). Therefore, from the teachings of Nishi, a skilled person in the art would not have arrived at the specific organic solvent (B) used in the present invention which contains a propylene glycol alkyl ether acetate in an amount of 70 to 90% by weight. In fact, the recited 70% to 90% is 2.33 to 3 fold higher than the percentage taught by Nishi.

Moreover, the present claims recite that the novolak resin (A) has 3 to 7 mol% of hydrogen atoms within those of all phenolic hydroxyl groups of the alkali soluble novolak resin substituted by 1,2-naphthoquinone diazide sulfonyl groups (i.e., the reaction rate of an esterification reaction is 3 to 7 mol%). The benefits obtained by this specific range are described in the specification at page 8 line 26 to page 9, line 1. Specifically, “by making the reaction rate 20 mol % or less, the tendency of the permeability decrease for i-line radiation can be controlled and decrease of sensitivity can be controlled, without impairing various characteristics. Also, the fall of the perpendicularity of form can be controlled. As the (A) component, one kind or a mixture of two or more kinds thereof can be used.”

In contrast to the range recited in the presently pending claims, Nishi teaches that the reaction rate (referred to as the “degree of substitution”) is preferably at least 20%, and that the

resolving power of the photoresist composition deteriorates if the degree of substitution is too low (see Nishi, column 6, lines 34 to 42). Therefore, Nishi actually teaches away from the use of the recited mol% range because, according to Nishi, a photoresist obtained using this reaction rate would have poor resolving power. As a result, it is improper to combine Nishi with the remaining references to create a *prima facie* showing of obviousness.

In view of the foregoing, the cited combination of references would not lead one of ordinary skill in the art to create the invention of the presently pending claims. Moreover, nothing in the cited combination of references would lead one of ordinary skill in the art to expect the results described above in connection with the rejection based on Bassett et al. In particular, nothing in the prior art would lead one of ordinary skill in the art to expect the increase in the development velocity or the unexpectedly high heat resistance obtained using the presently claimed invention. Thus, even if the combination of the cited combination of references would lead to the present invention (which they do not), the unexpected results would further evidence the nonobviousness of the claimed invention. Accordingly, withdrawal of the rejection based on Okazaki et al. is respectfully requested.

#### **Mizuta et al. (US 6,869,742)**

The Examiner alleges that it would have been *prima facie* obvious to use a mixture of ethyl lactate and polypropylene glycol monomethyl ether acetate or polypropylene glycol monomethyl ether acetate alone to dissolve the components such as the novolak resin having a degree of dispersion of 2.2 to 2.8 as well as have about 3.8% of the hydrogen atoms on the novolak resin substituted with a naphthoquinonediazide sulfonyl group and expect the same or similar results such as disclosed in Mizuta et al. for high resolution, sensitivity and definition.

However, as discussed above, Mizuta et al. alone would not produce the presently claimed invention, and certainly would not lead one of ordinary skill in the art to expect the results obtained by the presently claimed invention. Accordingly, in view of the amendments and comments presented above, Applicants respectfully request reconsideration and withdrawal of all of the rejections under 35 U.S.C. §103(a).

#### **CONCLUSION**

Applicants submit that all Claims are in condition for allowance. If minor matters remain that could be resolved by teleconference, the Examiner is invited to contact the undersigned at

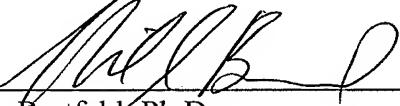
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the telephone number provided below. Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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Dated: 9/26/07

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